Washington State Ferries
Keystone Citizen Advisory Group

Information on Safety and Operational Issues from the Keystone Terminal Relocation Feasibility Study, August 2003[1]

- Since 1948, vessels using Keystone Harbor have increased in size from the 165-foot by 48-foot, all-wood MV *Defiance* to the 256-foot by 74-foot Steel Electrics MV *Quinault* and MV *Klickitat* in use today. In response to the increased size of vessels, the navigable channel was widened to 200 feet and deepened to –25′ mean lower low water (MLLW). (The original navigable channel was 150 feet wide, with the bottom of the channel at elevation –18′ MLLW.) (Page 6)
- As currently configured, the harbor does not ensure reliability for landings. The 99 sailings canceled at Keystone in 2001 represent 2.2 percent of the 4,410 annual scheduled sailings on that route. This percentage is more than four times the WSF system wide average of 0.5 percent. (Page 6)

[1] Doug Playter, CH2M Hill; *WSF Keystone Ferry Terminal Relocation Feasibility Study;* August 2003. Available online at http://www.wsdot.wa.gov/ferries/pdf/pt-key.pdf.

- Crosscurrents are the greatest challenge in landing a ferry at Keystone. Because of the several groundings at the entrance to the harbor over the years (see photo), WSF has a set policy that ferries may not enter the harbor when crosscurrents exceed 3.5 knots, as determined at the nearest monitoring station. (Page 6)
- The typical approach at other ferry terminals in the WSF system would have the vessel beginning to back down at 1/4 mile (1,320 feet) from the wing walls, or about 1,100 feet from the outer dolphin. This is often not possible at Keystone because of the crosscurrents at the south end of the jetty. As the bow of the vessel crosses an imaginary east-west line at the south end of the jetty, the bow encounters slack water while the stern is being pushed strongly to the west by the current. To counteract the current force on the stern of the vessel, the captain must maintain propeller thrust on the rudder to steer. Often the current force exceeds the vessel's ability to compensate and this causes the vessel to veer from the preferred straight-in approach. The vessel captain must then correct course inside the south end of the breakwater prior to backing down for the final approach. The typical back down distance in Keystone is only 720 feet from the wing walls, or about 500 feet from the outer dolphin, which is less than half of typical. This condition is the cause of several groundings each year at Keystone Harbor. (Page 6)
- Intuitively, one can see that if the vessel were to increase in size, the available width within the channel, as currently configured, to correct course and the back down distance would decrease. For example, if the 328-foot by 79-foot Issaquah class vessel were to be used in the harbor, the back down distance would be approximately 650 feet (less than half of typical), or about 430 feet to the outer dolphin, because the Issaquah class is 72 feet longer than the Steel Electric class. (Page 8)

Grounded State Ferry MV *Quinault* (source: Seattle Post-Intelligencer, August 23, 2002; photo credit: Meryl Schenker)

- The Keystone Conservation Area is part of the Washington Department of Fish and Wildlife marine sanctuary park system. This marine park was created in May 2002 (WAC 220-16-760). The boundaries of the park extend from the jetty, east to the east side of the abandoned Army pier, extending offshore for 600 feet and then paralleling shore to a point straight off of the east side of the jetty. The marine park is used primarily as a SCUBA diving recreational site. The main dive destination is the jetty, but the abandoned Army pier is listed as an alternative dive destination in *Northwest Shore Dives* (Fischnaller 1990). (Page 15)
- At the current time, there is a risk of divers straying into the channel and surfacing in front of an approaching ferry because of the patterns and intensity of the current at Keystone. The currents near the Keystone jetty can be very strong and do not move symmetrically with the tide. The current flows east during the early stage of one of the daily flood tides and flows strongly west during the latter stage of the flood tides and during both daily ebb tides. Divers can dive on either side of the jetty. At the end of the jetty, a moderate to very strong current moves west towards and across the ferry lane, which is very close by. (Page 15)
- The Keystone Harbor boat launch is near the existing ferry approach and landing (see Figure 4). Boaters are at risk if they stray into the middle of the harbor at the wrong time, which could happen as a result of not paying attention or from motor failure. It is common for an outboard motor to stall soon after launching when the motor is cold. When the ferry is adjacent to the boat launch, it is committed to its line of approach to the terminal and there is no room to maneuver away. In addition, the ferry may be off course or trying to redirect steerage after negotiating the shear currents at the south end of the jetty. (Page 16)